(b) The use of such allowable stress values must be specially approved by the Coast Guard for each application. Further information may be obtained by writing to the Commandant (CG–ENG), Attn: Office of Design and Engineering Systems, U.S. Coast Guard Stop 7509, 2703 Martin Luther King Jr. Avenue SE., Washington, DC 20593.

(c) Submittals must include information and calculations specified by the U.S. Coast Guard, Office of Design and Engineering Standards (CG–ENG) to demonstrate that the allowable stress for the material cannot be exceeded under any possible combination of vessel loads and metal temperature.

[CGD 73–133R, 39 FR 9179, Mar. 8, 1974, as amended by CGD 82–063b, 48 FR 4781, Feb. 3, 1983; CGD 95–072, 60 FR 50462, Sept. 29, 1995; CGD 96–041, 61 FR 50727, 50728, Sept. 27, 1996; USCG–2009–0702, 74 FR 49228, Sept. 25, 2009; USCG–2012–0832, 77 FR 59777, Oct. 1, 2012; USCG 2013–0671, 78 FR 60148, Sept. 30, 2013]

Subpart 54.10—Inspection, Reports, and Stamping

§ 54.10–1 Scope (modifies UG–90 through UG–103 and UG–115 through UG–120).

The inspection, tests, stamping, and reports for pressure vessels shall be as required by paragraphs UG–90 through UG–103 and UG–115 through UG–120 of section VIII of the ASME Boiler and Pressure Vessel Code (incorporated by reference; see 46 CFR 54.01–1) except as noted otherwise in this subpart.

[CGFR 68–82, 33 FR 18828, Dec. 18, 1968, as amended by USCG–2003–16630, 73 FR 65167, Oct. 31, 2008]

§ 54.10–3 Marine inspectors (replaces UG–90 and UG–91, and modifies UG–92 through UG–103).

(a) Only marine inspectors shall apply the Coast Guard Symbol. They will not apply any other code symbol to pressure vessels.

(b) All pressure vessels not exempted under provisions of § 54.01–15 shall be inspected by a marine inspector referring to procedures outlined in UG–92 through UG–103 of section VIII of the ASME Boiler and Pressure Vessel Code (incorporated by reference; see 46 CFR 54.01–1) and §§ 50.30–10, 50.30–15, and 50.30–20 of this subchapter. The marine inspector will then stamp the vessel with the Coast Guard Symbol.

(c) Pressure vessels described in § 54.01–5(c)(3), except pressure vessels in systems regulated under § 58.60 of this chapter, must be visually examined by a marine inspector prior to installation. The marine inspector also reviews the associated plans and manufacturers' data reports. If, upon inspection, the pressure vessel complies with the applicable requirements in § 54.01–5, the marine inspector stamps the pressure vessel with the Coast Guard Symbol.

[CGFR 68–82, 33 FR 18828, Dec. 18, 1968, as amended by CGD 77–147, 47 FR 21810, May 20, 1982; USCG–2003–16630, 73 FR 65167, Oct. 31, 2008]

§ 54.10–5 Maximum allowable working pressure (reproduces UG–98).

(a) The maximum allowable working pressure for a vessel is the maximum pressure permissible at the top of the vessel in its normal operating position at the designated coincident temperature specified for that pressure. It is the least of the values found for maximum allowable working pressure for any of the essential parts of the vessel by the principles given in paragraph (b) of this section and adjusted for any difference in static head that may exist between the part considered and the top of the vessel. (See appendix 3 of section VIII of the ASME Boiler and Pressure Vessel Code (incorporated by reference; see 46 CFR 54.01–1.)

(b) The maximum allowable working pressure for a vessel part is the maximum internal or external pressure, including the static head hereon, as determined by the rules and formulas in section VIII of the ASME Boiler and Pressure Vessel Code, together with the effect of any combination of loadings listed in UG–22 of section VIII of the ASME Boiler and Pressure Vessel Code (see 46 CFR 54.01–30) that are likely to occur, or the designated coincident operating temperature, excluding any metal thickness specified as corrosion allowance. (See UG–25 of section VIII of the ASME Boiler and Pressure Vessel Code.)

(c) Maximum allowable working pressure may be determined for more than one designated operating temperature,

using for each temperature the applicable allowable stress value.

NOTE: Table 54.10–5 gives pictorially the interrelation among the various pressure levels pertinent to this part of the regulations. It includes reference to section VIII of the ASME Boiler and Pressure Vessel Code for definitions and explanations.

Table 54.10-5--Pictorial Inter-Relation Among Various Pressure Levels with References to Specific Requirements[1]

Pressure differential[2]	Test pressures	Relief Device pressure settings	Pressures upon which flow capacity of relief devices is based
Increasing Pressure →	Burst-proof test (UG-101(m) of section VIII of the ASME Boiler and Pressure Vessel Code		
	Yield-proof test (UG-101(j) of section VIII of the ASME Boiler and Pressure Vessel Code)		
	Standard hydrostatic test (UG-99 of section VIII of the ASME Boiler and Pressure Vessel Code)		
			Fire exposure, 120% MAWP
	Pneumatic test (UG-100 of section VIII of the ASME Boiler and Pressure Vessel Code)		
		Rupture disk burst (§ 54.15-13)	
			Normal, 110% MAWP

	Maximum allowable working pressure (MAWP), UG-98 of section VIII of the ASME Boiler and Pressure Vessel Code	Maximum allowable working pressure (MAWP), UG-98 of section VIII of the ASME Boiler and Pressure Vessel Code	Maximum allowable working pressure (MAWP), UG-98 of section VIII of the ASME Boiler and Pressure Vessel Code
Increasing Pressure ↑	Design pressure, UG-21 and Appendix 3 of section VIII of the ASME Boiler and Pressure Vessel Code	Design pressure, UG-21 and Appendix 3 of section VIII of the ASME Boiler and Pressure Vessel Code	Design pressure, UG-21 and Appendix 3 of section VIII of the ASME Boiler and Pressure Vessel Code
		Safety or relief valve setting (UG-133 of section VIII of the ASME Boiler and Pressure Vessel Code)	
	Operating Pressure (Appendix 3 of section VIII of the ASME Boiler and Pressure Vessel Code)	Operating Pressure (Appendix 3 of section VIII of the ASME Boiler and Pressure Vessel Code)	Operating Pressure (Appendix 3 of section VIII of the ASME Boiler and Pressure Vessel Code)

[1] For basic pressure definitions see 46 CFR 52.01-3(g) of this subchapter. Section VIII of the ASME Boiler and Pressure Vessel Code; see 46 CFR 54.01-1.
[2] For pressure differentials above 3,000 pounds per square inch (p.s.i.), special requirements may apply. Arrow of increasing pressure in left column signifies that, for example, the standard hydrostatic-test pressure is higher than the MAWP, which in turn is higher than the design pressure and the operating pressure, and so forth.

[USCG–2003–16630, 73 FR 65167, Oct. 31, 2008]

§ 54.10–10 Standard hydrostatic test (modifies UG–99).

(a) All pressure vessels shall satisfactorily pass the hydrostatic test prescribed by this section, except those pressure vessels noted under § 54.10–15(a).

(b) The hydrostatic-test pressure must be at least one and three-tenths (1.30) times the maximum allowable working pressure stamped on the pressure vessel, multiplied by the ratio of the stress value ''S'' at the test temperature to the stress value ''S'' at the design temperature for the materials of which the pressure vessel is constructed. The values for ''S'' shall be taken from tables UCS 23, UNF 23, UHA 23, or UHT 23 of section VIII of the ASME Boiler and Pressure Vessel Code (incorporated by reference, see 46 CFR 54.01–1). The value of ''S'' at test temperature shall be that taken for the material of the tabulated value of temperature closest to the test temperature. The value of ''S'' at design temperature shall be as interpolated from the appropriate table. No ratio less than one shall be used. The stress resulting from the hydrostatic test shall not exceed 90 percent of the yield stress of the material at the test temperature. External loadings which will exist in supporting structure during the hydrostatic test should be considered. The design shall consider the combined stress during hydrostatic testing due to pressure and the support reactions. This stress shall not exceed 90 percent of the yield stress of the material at the test temperature. In addition the adequacy of the supporting structure during hydrostatic testing should be considered in the design.

(c) The hydrostatic test pressure shall be applied for a sufficient period of time to permit a thorough examination of all joints and connections. The test shall not be conducted until the vessel and liquid are at approximately the same temperature.

(d) Defects detected during the hydrostatic test or subsequent examination shall be completely removed and then inspected. Provided the marine inspector gives his approval, they may then be repaired.

(e) Vessels requiring stress relieving shall be stress relieved after any welding repairs have been made. (See UW–40 of section VIII of the ASME Boiler and Pressure Vessel Code.)

(f) After repairs have been made the vessel shall again be tested in the regular way, and if it passes the test, the marine inspector may accept it. If it does not pass the test, the marine inspector can order supplementary repairs, or, if in his judgment the vessel is not suitable for service, he may permanently reject it.

[CGFR 68–82, 33 FR 18828, Dec. 18, 1968, as amended by USCG–2003–16630, 73 FR 65170, Oct. 31, 2008]

§ 54.10–15 Pneumatic test (modifies UG–100).

(a) Pneumatic testing of welded pressure vessels shall be permitted only for those units which are so designed and/or supported that they cannot be safely filled with water, or for those units which cannot be dried and are to be used in a service where traces of the testing medium cannot be tolerated.

(b) Proposals to pneumatically test shall be submitted to the cognizant Officer in Charge, Marine Inspection, for approval.

(c) Except for enameled vessels, for which the pneumatic test pressure shall be at least equal to, but need not exceed, the maximum allowable working pressure to be marked on the vessel, the pneumatic test pressure shall be at least equal to one and one-tenth (1.10) times the maximum allowable working pressure to be stamped on the vessel multiplied by the lowest ratio (for the materials of which the vessel is constructed) of the stress value ''S'' for the test temperature of the vessel to the stress value ''S'' for the design temperature (see UG–21 of section VIII of the ASME Boiler and Pressure Vessel Code (incorporated by reference; see 46 CFR 54.01–1)). In no case shall the pneumatic test pressure exceed one and one-tenth (1.10) times the basis for calculated test pressure as defined in UA–60(e) of section VIII of the ASME Boiler and Pressure Vessel Code.

(d) The pneumatic test of pressure vessels shall be accomplished as follows: